

CLAIMS

We claim:

1. A currency counting and discrimination device for receiving a stack of currency bills, rapidly counting and discriminating the bills in the stack, and then re-stacking the bills comprising:
 - an input receptacle for receiving a stack of currency bills to be discriminated;
 - a discriminating unit for discriminating the denomination of said currency bills;
 - one or more output receptacles for receiving said currency bills after being discriminated by said discriminating unit;
 - a transport mechanism for transporting said currency bills, one at a time, from said input receptacle past a sensor of said discriminating unit and to said one or more output receptacles;
 - one or more counters keeping track of the value of bills discriminated; and
 - value indicating means for an operator of said device to indicate the value of any bills whose denomination are not determined by said discriminating unit, said bills whose denomination are not determined by said discriminating unit being no call bills, said means appropriately effecting said one or more counters.

2. The discrimination device of claim 1 wherein said value indicating means comprise denomination selection elements.

3 The discrimination device of claim 1 having a single output receptacle.

4 The discrimination device of claim 1 having exactly two output receptacles.

5. The discrimination device of claim 1 wherein the operation of said device is suspended when said discriminating unit is unable to identify the denomination of a bill.

6. The discrimination device of claim 5 having a single output receptacle and wherein the value of a no bill is added to appropriate ones of said one or more

counters through the use of said value indicating means when the operation of said device is suspended and wherein the operation of the device is thereafter resumed.

7. The discrimination device of claim 6 wherein said value indicating means comprise denomination selection elements.

8. The discrimination device of claim 5 having exactly two output receptacles and wherein the value of a no bill is added to appropriate ones of said one or more counters through the use of said value indicating means when the operation of said device is suspended and wherein the operation of the device is thereafter resumed.

9. The discrimination device of claim 8 wherein said value indicating means comprise denomination selection elements.

10. The discrimination device of claim 5 comprising two or more output receptacles and wherein no call bills are delivered to a different one of said output receptacles than bills whose denominations are determined by said discriminating unit.

11. The discrimination device of claim 5 further comprising an inspection station and wherein no call bills are delivered to said inspection station.

12. The discrimination device of claim 1 comprising two or more output receptacles and wherein no call bills are delivered to a different one of said output receptacles than bills whose denominations are determined by said discriminating unit.

13. The discrimination device of claim 12 wherein the operation of said device is not suspended when a no call bill is encountered.

14. The discrimination device of claim 13 wherein the values of any no call bills are added to appropriate ones of said one or more counters through the use of said

2 value indicating means after all the bills placed in said input receptacle have been processed.

15. The discrimination device of claim 14 having exactly two output receptacles.

2 16. The discrimination device of claim 14 wherein said value indicating means comprise denomination selection elements.

2 17. The discrimination device of claim 13 wherein the value of a no call bill may be added to appropriate ones of said one or more counters through the use of said value indicating means any time after said no call bill has been identified.

18. The discrimination device of claim 17 having exactly two output receptacles.

2 19. The discrimination device of claim 1 further comprising means for prompting an operator of the device as to the denomination of a no call bill.

2 20. The discrimination device of claim 19 wherein said value indicating means comprise denomination selection elements.

2 21. The discrimination device of claim 19 wherein said prompting means initially suggests that the denomination of a no call bill is the same as that of an immediately prior bill.

2 22. The discrimination device of claim 19 wherein said prompting means initially suggests that the denomination of a no call bill is the same as that of the last bill whose denomination was determined by said discriminating unit.

2 23. The discrimination device of claim 19 wherein said prompting means initially suggests that the denomination of a no call bill is the same as that of the last bill that was a no call bill.

24. The discrimination device of claim 19 wherein said discriminating unit
2 determines the denomination of a bill by comparing a scanned data retrieved from
4 said bill by said sensor with master data associated with one or more genuine bills
and wherein said prompting means initially suggests that the denomination of a no
6 call bill is the denomination associated with the master data that most closely matches
the scanned data.

25. The discrimination device of claim 19 wherein said discriminating unit
2 determines the denomination of a bill by comparing a scanned pattern retrieved from
4 said bill by said sensor with one or more master patterns associated with one or more
genuine bills and wherein said prompting means initially suggests that the
6 denomination of a no call bill is the denomination associated with the master pattern
that most closely matches the scanned pattern.

26. The discrimination device of claim 25 wherein said discriminating unit
2 calculates a correlation number for each of said one or more master patterns based on
4 said comparison between said scanned pattern and said one or more master patterns
and wherein said prompting means initially suggests that the denomination of a no
6 call bill is the denomination associated with the master pattern that has the highest
correlation number.

27. The discrimination device of claim 19 further comprising means for permitting
2 an operator of the device to select one or more denominations and their relative order
4 to be suggested in connection with no call bills and wherein said prompting means
suggests one or more denominations for a no call bill according to said selections
made by said operator.

28. The discrimination device of claim 19 further comprising a memory for
2 storing historical information regarding the denominations of previous no calls and
4 wherein said prompting means suggests one or more denominations for a no call bill
based on said historical information.

29. The discrimination device of claim 28 wherein said prompting means suggests
2 one or more denominations for a no call bill based on the frequency of occurrence of
no call bills for each of a plurality of denominations.

30. The discrimination device of claim 29 wherein said prompting means initially
2 suggests the denomination that has had the highest frequency of no call bills.

31. A currency counting and discrimination device for receiving a stack of
2 currency bills, rapidly counting and discriminating the bills in the stack, and then re-
stacking the bills comprising:

4 an input receptacle for receiving a stack of currency bills to be discriminated;
a discriminating unit for discriminating the denomination of said currency
6 bills;

8 one or more output receptacles for receiving said currency bills after being
discriminated by said discriminating unit;

10 a transport mechanism for transporting said currency bills, one at a time, from
said input receptacle past a sensor of said discriminating unit and to said one or more
output receptacles;

12 one or more counters keeping track of the value of bills discriminated;
means for flagging bills meeting or failing to meet to predetermined criteria,
14 and

16 value indicating means for an operator of said device to indicate the value of
any flagged bills, said means appropriately effecting said one or more counters.

32. The discrimination device of claim 31 having a single output receptacle.

33. The discrimination device of claim 31 comprising two or more output
2 receptacles and wherein no call bills are delivered to a different one of said output
receptacles than bills whose denominations are determined by said discriminating
4 unit.

34. The discrimination device of claim 33 wherein the operation of said device is
2 not suspended when a no call bill is encountered.
35. The discrimination device of claim 34 wherein the values of any no call bills
2 are added to appropriate ones of said one or more counters through the use of said
4 value indicating means after all the bills placed in said input receptacle have been
processed.
36. The discrimination device of claim 34 wherein said means for flagging flags a
2 suspect bill by suspending the operation of said counting and discrimination device.
37. The discrimination device of claim 31 having exactly two output receptacles.
38. The discrimination device of claim 31 further comprising an inspection station
2 and wherein no call bills are delivered to said inspection station.
39. The currency counting and discrimination device of claim 31 wherein said
2 predetermined criteria is said discriminating unit identifying the denomination of a
4 bill and wherein said flagging means flags a bill failing to be identified by said
device, said device being halted so that said flagged bill is located at a predetermined
6 position within said discrimination device when said transport mechanism stops.
40. The discrimination device of claim 39 having a single output receptacle and
2 wherein the value of a no bill is added to appropriate ones of said one or more
4 counters through the use of said value indicating means when the operation of said
device is suspended and wherein the operation of the device is thereafter resumed.
41. The discrimination device of claim 39 having exactly two output receptacles
2 and wherein the value of a no bill is added to appropriate ones of said one or more
4 counters through the use of said value indicating means when the operation of said
device is suspended and wherein the operation of the device is thereafter resumed.

42. The discrimination device of claim 39 comprising two or more output
2 receptacles and wherein no call bills are delivered to a different one of said output
4 receptacles than bills whose denominations are determined by said discriminating
unit.

43. A currency counting and discrimination device for receiving a stack of
2 currency bills, rapidly counting and discriminating the bills in the stack, and then re-
4 stacking the bills comprising:

6 an input receptacle for receiving a stack of currency bills to be discriminated;
8 a discriminating unit for discriminating said currency bills based on a
10 predetermined criteria;

12 one or more output receptacles for receiving said currency bills after being
14 discriminated by said discriminating unit;

16 a transport mechanism for transporting said currency bills, one at a time, from
18 said input receptacle passed said discriminating unit and to one of said one or more
20 output receptacles;

22 either (a) one or more denomination counters associated with one or more
24 denominations; each counter keeping track of the number of discriminated bills
or

26 (b) a total value counter maintaining the total value of said bills as they are
discriminated by said discrimination unit; or

(c) both one or more denomination counters and a total value counter;
wherein a bill is flagged when it fails to satisfy said predetermined criteria or
when said discriminating unit fails to identify said predetermined criteria for a bill,
the operation of said counting and discrimination device being suspended when a bill
is flagged, said device being halted so that said flagged bill is located at a
predetermined position within said discrimination device when said transport
mechanism stops, thereby permitting an operator to examine said flagged bill;

denomination selection elements corresponding to one or more denominations
whereby selection of one of said denomination selection elements increases either (i)
a denomination counter corresponding to the denomination of said flagged bill, (ii)

28 said total value counter by the value of said flagged bill, or (iii) both and whereby
29 said currency discrimination device resumes operation; said denomination selection
30 elements enabling said operator to increment a respective denomination counter
31 and/or total value counter and to restart the operation of the currency discriminator
32 when said operator determines said flagged bill is acceptable; and
33 a continuation element the selection of which resumes operation of said
34 currency discriminator without increasing one of said denomination counters or said
35 total value counter.

44. The discrimination device of claim 43 having a single output receptacle.

45. The discrimination device of claim 43 having exactly two output receptacles.

46. The discrimination device of claim 43 wherein said predetermined criteria is
2 denomination and wherein the operation of said counting and discrimination device
4 being suspended when said discriminating unit is unable to identify the denomination
 of a bill, a bill whose denomination is not determined by said discriminating unit
 being a no call bill.

47. The discrimination device of claim 46 having a single output receptacle.

48. The discrimination device of claim 46 having exactly two output receptacles.

49. The currency discrimination device of claim 43 wherein said continuation
2 element permits an operator to remove said flagged bill from said predetermined
4 position before said discriminator resumes operation when said operator determines
 said flagged bill is not acceptable.

50. The discrimination device of claim 43 wherein said predetermined position
2 within said discrimination device when said transport mechanism stops is the position
4 within one of said one or more output receptacles associated with the last received
 bill in said one or said one or more output receptacles.

2 51. The discrimination device of claim 43 further comprising an inspection station
and wherein said predetermined position within said discrimination device when said
transport mechanism stops is an inspection station.

2 52. The discrimination device of claim 43 wherein said denomination selection
elements enable said operator to re-orient the failing bill within said predetermined
position before the operation of the discrimination device is resumed if desired.

2 53. The discrimination device of claim 52 wherein said predetermined criteria is a
bill having a predetermined forward/reverse orientation.

2 54. The discrimination device of claim 52 wherein said predetermined criteria is a
bill having a predetermined face orientation.

2 55. A currency counting and discrimination device for receiving a stack of
currency bills, rapidly counting and discriminating the bills in the stack, and then
transferring identified bills to one of a plurality of output receptacles, comprising:

4 an input receptacle for receiving a stack of currency bills to be discriminated;
6 a discriminating unit for discriminating said currency bills based on a
predetermined criteria;

8 one or more output receptacle for receiving said currency bills after being
discriminated by said discriminating unit;

10 a transport mechanism for transporting said currency bills, one at a time, from
said input receptacle passed said discriminating unit to either

12 (a) an appropriate one of said one or more output receptacles when said
discriminating unit is able to discriminate a bill based on said predetermined criteria
or

14 (b) an inspection station when said discriminating unit is unable to
discriminate a bill based on said criteria; wherein the operation of said counting and
16 discrimination device is thereafter suspended in the event of an undiscriminated bill,
thereby permitting an operator to conveniently examine said undiscriminated bill;

18 either (a) one or more denomination counters associated with one or more
19 denominations; each counter keeping track of the number of discriminated bills
20 belonging to the associated denomination as determined by said discrimination unit;
21 or
22 (b) a total value counter maintaining the total value of said bills as they are
23 discriminated by said discrimination unit; or
24 (c) both one or more denomination counters and a total value counter;
25 denomination selection elements corresponding to one or more denominations
26 whereby selection of one of said denomination selection elements (a) increases either
27 (i) a denomination counter corresponding to the denomination of said selected
28 denomination selection element, (ii) said total value counter by the value associated
29 with said selected denomination selection element, or (iii) both and (b) restarts the
30 operation of said currency counting and discrimination device; said transport
31 mechanism hereafter transporting said undiscriminated bill to an appropriate one of
32 said output receptacles; said denomination selection elements enabling said operator
33 to thereby conveniently increment a respective denomination counter and/or total
34 value counter and to restart the operation of the currency counting and discrimination
35 device when said operator determines said undiscriminated bill is acceptable; and
36 a continuation element the selection of which resumes operation of said
37 currency counting and discrimination device without increasing one of said
38 denomination counters or said total value counter; said undiscriminated bill either
39 being removed without replacement from said inspection station or said transport
40 mechanism hereafter transporting said undiscriminated bill to a reject receptacle; said
41 continuation element permitting said operator to remove said undiscriminated bill
42 from said inspection station before said device resumes operation or have said
43 undiscriminated bill transported to said reject receptacle after said device resumes
44 operation when said operator determines said undiscriminated bill is not acceptable.

56. The discrimination device of claim 55 having a single output receptacle.

57. The discrimination device of claim 55 having exactly two output receptacles.

58. The discrimination device of claim 55 wherein said predetermined criteria is
2 denomination and wherein a bill whose denomination is not determined by said
discriminating unit is transported to said inspection station and wherein the operation
4 of said counting and discrimination device is suspended.
59. The discrimination device of claim 58 having a single output receptacle.
60. The discrimination device of claim 58 having exactly two output receptacles.
61. A method of discriminating and counting documents comprising the steps of:
2 receiving a stack of documents in an input receptacle;
4 feeding said documents in said input receptacle one at a time to a
discriminating unit; and
6 transferring said documents from said discriminating unit to an output
receptacle;
8 incrementing a count corresponding to a plurality of different types of
documents the system is capable of discriminating when said discriminating unit
identifies a document;
10 stopping said transferring step when said discriminating unit is unable to
identify a document so that said unidentified document is located at a predetermined
12 position within said output receptacle;
14 examining said unidentified document; and either
16 (a) depressing a key corresponding to the identity of said unidentified
document when said examining step results in a determination that said document is
acceptable, whereby said corresponding count associated with the denomination of
said unidentified document is incremented and said transferring step is continued;
18 (b) removing said unidentified document without replacement when said
examining step does not result in a determination that said unidentified document is
20 acceptable and depressing a continuation key whereby said transferring step is
continued.

62. A method of discriminating and counting documents comprising the steps of:
2 receiving a stack of documents in an input receptacle;
4 feeding said documents in said input receptacle one at a time to a
discriminating unit; and
6 discriminating said documents based on a predetermined criteria;
8 transferring said documents from said discriminating unit to an output
receptacle;
10 incrementing a count corresponding to a plurality of different types of
documents the system is capable of discriminating when said discriminating unit
12 identifies a document as satisfying said predetermined criteria;
14 stopping said transferring step when a document fails to satisfy said
predetermined criteria or when said discriminating unit is unable to determine
whether a document satisfies said predetermined criteria, said transferring step
16 stopping so that the document that triggered said stopping step is located at a
predetermined position within said output receptacle;
18 examining said triggering document; and either
20 (a) depressing a key corresponding to the identity of said triggering document
when said examining step results in a determination that said document is acceptable,
whereby said corresponding count associated with the identity of said triggering
document is incremented and said transferring step is continued;
22 (b) removing said triggering document without replacement when said
examining step does not result in a determination that said triggering document is
acceptable and depressing a continuation key whereby said transferring step is
24 continued.

63. A document counting and discrimination device for receiving a stack of
2 documents, rapidly counting and discriminating the documents in the stack, and then
re-stacking the documents comprising:
4 an input receptacle for receiving a stack of documents to be discriminated;
6 a discriminating unit for discriminating said documents as belonging to one or
more document-types;

8 an output receptacle for receiving said documents after being discriminated by
said discriminating unit;

10 a transport mechanism for transporting said documents, one at a time, from
said input receptacle passed said discriminating unit to said output receptacle;

12 either (a) one or more document-type counters associated with one or more
document-types; each counter keeping track of the number of discriminated
documents belonging to the associated document-type as determined by said
discrimination unit; or

14 (b) a total value counter maintaining the total value of said discriminated
documents as they are discriminated by said discrimination unit where said documents
have associated values or denominations; or

16 (c) both one or more document-type counters and a total value counter;
18 wherein the operation of the discrimination device is suspended when said
discriminating unit is unable to identify a document; the operation of the device being
20 stopped so that said unidentified document is the last document transported to said
output receptacle before the operation of the device is suspended, thereby permitting
22 an operator to conveniently examine said unidentified document;

24 document-type selection elements corresponding to one or more document-
types whereby selection of one of said document-type selection elements increases
26 either (i) a document-type counter corresponding to said unidentified document, (ii)
said total value counter by the value of said unidentified document, or (iii) both and
28 whereby the document discrimination device resumes operation; said document-type
selection elements enabling said operator to thereby conveniently increment a
30 respective denomination counter and/or total value counter and to restart the
operation of the document discriminator when said operator determines said
32 unidentified document is acceptable; and

34 a continuation element the selection of which resumes operation of the
document discrimination device without increasing one of said denomination counters
or said total value counter, thereby permitting said operator to remove said
36 unidentified document from said output receptacle before said discriminator resumes
operation when said operator determines said unidentified document is not acceptable.

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64. A currency discriminating device comprising:

2 a discriminating unit for discriminating currency bills based on their
forward/reverse orientation;

4 wherein said discriminating device flags any bills failing to be oriented in a
predetermined forward or reverse direction.

65. The discriminating device of claim 64 further comprising

2 an output receptacle for receiving said currency bills after being discriminated
by said discriminating unit;

4 a transport mechanism for transporting said currency bills, one at a time,
passed said discriminating unit and to said output receptacle;

6 wherein a bill is flagged by suspending the operation of said discriminating
device so that said flagged bill is the last bill transported to said output receptacle
8 before the operation of said device is suspended.

66. The discriminating device of claim 64 further comprising

2 a first output receptacle for receiving currency bills that are oriented in said
predetermined direction;

4 a second output receptacle for receiving currency bills that are not oriented in
said predetermined direction;

6 a transport mechanism for transporting said currency bills, one at a time,
passed said discriminating unit and to said output receptacles;

8 wherein a bill is flagged by being transported to said second output receptacle.

67. A currency discriminating device comprising:

2 a discriminating unit for discriminating currency bills based on their
forward/reverse orientation;

4 one or more first set output receptacles for receiving said currency bills after
being discriminated by said discriminating unit;

6 one or more second set output receptacles for receiving said currency bills
after being discriminated by said discriminating unit;

8 a transport mechanism for transporting said currency bills, one at a time,
passed said discriminating unit and to said output receptacles, whereby bills oriented
10 in the forward direction are deposited in said first set receptacles and bills oriented in
 the reverse direction are deposited in said second set receptacles.

68. A document discriminating device comprising:

2 a discriminating unit for discriminating documents based on their
 forward/reverse orientation;

4 wherein said discriminating device flags any documents failing to be oriented
 in a predetermined forward or reverse direction.

69. A method of discriminating currency comprising the steps of:

2 scanning currency bills along a predetermined segment and generating a
 scanned pattern based on said scanning;

4 comparing said scanned pattern to master patterns associated with forward and
 reverse scans of one or more genuine bills; and

6 identifying a bill and whether it is oriented in the forward or reverse direction
 based on said comparing step.

70. The method of claim 69 further comprising the step of:

2 flagging a bill based on its forward/reverse orientation.

71. The method of claim 69 further comprising the step of:

2 sorting bills based on their forward/reverse orientation.

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